



WEBTRANS

ASM XML INTERFACE SPECIFICATION

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MISO

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1. Overview

1.1 Introduction

This document describes the XML implementation of the data exchange with the Physical Scheduling System (PSS). Messages contain data in an XML format, using a SOAP (Simple Object Access Protocol) wrapper, and are sent using the HTTP protocol.

The PSS programmatic data exchange API provides the following interfaces:

- After-The-Fact Schedule Upload - Allows Control Areas to upload changes to their schedules after-the-fact.
- Control Area Actuals - Allows Control Areas to upload interchange actual MWhr with neighboring Control Areas.
- Schedule Approval Action - The entities that have approval rights over the physical schedules typically approve or deny schedules from the PSS user interface. This action is also provided through the programmatic API.
- Schedule Download - The Control Areas can download their schedules based on changes since last download or all schedules for a specified time frame.
- Market Participant Schedule Download - The market participants can download submitted and cleared MW amounts for day ahead schedules, and submitted MW amounts for real time schedules.

1.2 Request/Reply Messaging

The PSS API protocol is the request/reply method where the client (Control Area or other entities using PSS) issues the SOAP message with the XML payload and waits for response from the PSS server. Therefore the client interaction with PSS is a synchronous interface. PSS does not push any data to the clients and all requests are initiated by the client.

1.3 Web Technology

The implemented API uses the standard web technologies: XML, SOAP, and HTTP protocol. The data types and definition of the data submittal and the corresponding response are

documented in two XML schema files. The SOAP envelope body element is used to wrap the XML payload.

1.4 Method of Access

The PSS API is accessible only via the Internet. No access is permitted via participants' WAN connections to Midwest ISO.

1.5 Request Format Overview

```
<?xml version="1.0"?>
```

```
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
```

```
<SOAP-ENV:Body>
```

```
...
```

```
</SOAP-ENV:Body>
```

```
</SOAP-ENV:Envelope>
```

The content of the body is described in the sections that describe each interface.

1.6 Response Format Overview

1.6.1 Success Response

The success response (including the SOAP envelope) is:

```
<?xml version="1.0"?>
```

```
<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
```

```
<SOAP-ENV:Body>
```

```
...
```

```
</SOAP-ENV:Body>
```

```
</SOAP-ENV:Envelope>
```

The content of the body is described in the sections that describe each interface.

1.6.2 Error Response

The error response (including the SOAP envelope) is:

```
<?xml version="1.0"?>

<SOAP-ENV:Envelope xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/">
  <SOAP-ENV:Body>

    <SOAP-ENV:Fault>

      <faultcode>123</faultcode>

      <faultstring>An error has occurred.</faultstring>

    </SOAP-ENV:Fault>

  </SOAP-ENV:Body>

</SOAP-ENV:Envelope>
```

Presence of Fault section in the SOAP body indicates that an error has occurred. The error is either a business logic error or a data communication error. The error message is returned in the “faultstring.”

1.7 HTTP Command and Headers

All requests should be submitted as HTTP POST messages. For example:

```
POST /sched/mes/xml/sched-mes-soap-entrypoint.wml HTTP/1.1

Host: somewhere.midwestiso.org

Content-type: text/xml

Content-length: ddd

SOAPAction: SubmitRequest

<body content>
```


These interfaces may work with HTTP version 1.0; however, HTTP version 1.1 is recommended.

The “Host” header should be used according to the HTTP version 1.1 Specification.

The “Content-type” must be “text/xml”. The “Content-length” header specifies the length in bytes of the of the <body content>.

The “SOAPAction” action header is required and must have a value of “SubmitRequest” or “QueryRequest”; this value must also match the name of the first element within the SOAP body.

<body content> is a placeholder for the actual XML content of the message. The line terminators used within the content may either be a single linefeed character or a carriage return followed by a linefeed. The content of all messages must begin with the following line:

```
<?xml version="1.0"?>
```

1.8 XML Schema

Three (3) XML schemas are required. The first schema is for the SOAP standard and must be used as indicated in the sections above. The second schema is in “miso-pss-interfaces.xsd”, which is for the request messages as described in this document; the third schema is in “miso-pss-interfaces-response.xsd”, which describes the responses from these interfaces. These latter two schemas are published by Midwest ISO.

Note that both the request and response schemas contain an element named “Schedule”. These elements are for different purposes and the schema for them is not the same.

2. Interfaces

2.1 After-The-Fact Schedule Upload

2.1.1 Purpose

This message format is used to submit after-the-fact schedule data. Existing schedules can be updated or new schedules created. This interface is available to Control Areas.

2.1.2 Submittal Format

The submit request message format is as follows:

```
<SubmitRequest>
```

```
<Schedule>
```

```
  <ScheduleHeader>
```

```
    <ScheduleName>ATF_SCHEDULE_01</ScheduleName>
```

```
    <Requestor>XYZ</Requestor>
```

```
  </ScheduleHeader>
```

```
  <ScheduleTable>
```

```
    <ReferenceEntity>MISO</ReferenceEntity>
```

```
    <SourceCA>ABC</SourceCA>
```

```
    <SinkCA>XYZ</SinkCA>
```

```
    <SourceGenerator></SourceGenerator>
```

```
    <LoadEntity></LoadEntity>
```

```
    <PSE></PSE>
```

```
    <ScheduleType>Energy</ScheduleType>
```

```
    <TimeZone>ES</TimeZone>
```

```
  </ScheduleTable>
```

```
<ScheduleProfileTable>

  <Block>

    <StartTime>2003-10-07T12:00:00</StartTime>

    <StopTime>2003-10-07T14:00:00</StopTime>

    <MWImport>100</MWImport>

    <MWExport></MWExport>

    <Ramp>

      <RampStartTime>2003-07-07T11:55:00</RampStartTime>

      <RampDuration>10</RampDuration>

    </Ramp>

  </Block>

</ScheduleProfileTable>

<OASISTable>

  <Reservation>

    <Provider>Midwest ISO</Provider>

    <OASISNumber>123</OASISNumber>

    <NERCPriority>2</NERCPriority>

  </Reservation>

</OASISTable>

</Schedule>

</SubmitRequest>
```

The following table describes each of the elements and attributes:

Element or Attribute	Data Type	Description
<Schedule>	○ Complex type	○ Root element of schedule data. Can only appear once per message.
○ <ScheduleHeader>	○ Complex type	○ Contains information used to identify the schedule. Must appear exactly once per schedule.
○ <ScheduleName>	○ Character	○ Schedule name. Can be up to 30 characters long.
○ <Requestor>	○ Character	○ Acronym of the Control Area that is submitting the schedule.
○ <ScheduleTable>	○ Complex type	○ Contains various properties of the schedule. Must appear exactly once per schedule.
○ <ReferenceEntity>	○ Character	○ Acronym of the Control Area that the schedule is for; must = "MISO".
○ <SourceCA>	○ Character	○ Source Control Area. Must match ReferenceEntity for export schedules.
○ <SinkCA>	○ Character	○ Sink Control Area. Must match ReferenceEntity for import schedules.
○ <SourceGenerator>	○ Character	○ Source generator for schedule; can be left empty.
○ <LoadEntity>	○ Character	○ Load entity for schedule; can be left empty.
○ <PSE>	○ Character	○ Acronym of PSE; can be left empty if submitting a new schedule.
○ <ScheduleType>	○ Character	○ Must be of one of the supported schedule types: Energy, Dynamic, etc.
○ <TimeZone>	○ Character	○ Two-character timezone designation, for example, "UT", "CS", or "ES". This timezone is used to interpret the times in the profile.
○ <ScheduleProfileTable>	○ Complex type	○ Begins the profile section. This element is required.
○ <Block>	○ Complex type	○ Represents a single block of

		time in the profile. Multiple occurrences are allowed, but the occurrences must be ordered by time.
○ <StartTime>	○ DateTime	○ Start time of profile block, relative to the time zone specified in the header.
○ <StopTime>	○ DateTime	○ Stop time of profile block, relative to the time zone specified in the header.

Element or Attribute	Data Type	Description
<MWImport>	<ul style="list-style-type: none"> ○ Non-negative integer 	<ul style="list-style-type: none"> ○ Import MW value. Must be empty for export schedules; required for import and wheel schedules.
<ul style="list-style-type: none"> ○ <MWExport> 	<ul style="list-style-type: none"> ○ Non-negative integer 	<ul style="list-style-type: none"> ○ Export MW value. Must be empty for import schedules; required for export and wheel schedules.
<ul style="list-style-type: none"> ○ <Ramp> 	<ul style="list-style-type: none"> ○ Complex type 	<ul style="list-style-type: none"> ○ Optional ramp information.
<ul style="list-style-type: none"> ○ <RampStartTime> 	<ul style="list-style-type: none"> ○ DateTime 	<ul style="list-style-type: none"> ○ Start time of ramp (required value when ramp is specified).
<ul style="list-style-type: none"> ○ <RampDuration> 	<ul style="list-style-type: none"> ○ Non-negative integer 	<ul style="list-style-type: none"> ○ Ramp duration, in minutes (required value when ramp is specified).
<ul style="list-style-type: none"> ○ <OasisTable> 	<ul style="list-style-type: none"> ○ Complex type 	<ul style="list-style-type: none"> ○ Begins section for oasis reservations to associate with the schedule. This element is optional.
<ul style="list-style-type: none"> ○ <Reservation> 	<ul style="list-style-type: none"> ○ Complex type 	<ul style="list-style-type: none"> ○ Represents a single oasis reservation to associate with the schedule. Multiple occurrences are allowed.
<ul style="list-style-type: none"> ○ <Provider> 	<ul style="list-style-type: none"> ○ Character 	<ul style="list-style-type: none"> ○ Provider of the reservation.
<ul style="list-style-type: none"> ○ <OasisNumber> 	<ul style="list-style-type: none"> ○ Character 	<ul style="list-style-type: none"> ○ Assignment reference number.
<ul style="list-style-type: none"> ○ <NERCPriority> 	<ul style="list-style-type: none"> ○ Non-negative integer 	<ul style="list-style-type: none"> ○ Curtailment priority.

2.1.3 Response Format

The success response is:

```
<SubmitResponse>
```

```
    <Success></Success>
```

```
</SubmitResponse>
```

2.2 Control Area Actuals

2.2.1 Purpose

This message format is used to submit Control Area “actual” MWh values. This interface is available to Control Areas.

2.2.2 Submittal Format

The submit request message format is as follows:

```

<SubmitRequest>

<Actuals>

  <CA1>XYZ</CA1>

  <CA2>ABCD</CA2>

  <HourlyProfile>

    <Block>

      <StartTime>2003-07-07T12:00:00</StartTime>

      <MWhImport>100</MWhImport>

      <MWhExport>75</MWhExport>

    </Block>

  </HourlyProfile>

</Actuals>

</SubmitRequest>
  
```

The following table describes each of the elements and attributes:

Element or Attribute	Data Type	Description
<Actuals>	<ul style="list-style-type: none"> ○ Complex type 	<ul style="list-style-type: none"> ○ Root element of actuals data. Can only appear once per message.
<CA1>	<ul style="list-style-type: none"> ○ Character 	<ul style="list-style-type: none"> ○ Control Area acronym of the requestor.

<CA2>	<ul style="list-style-type: none"> ○ Character 	<ul style="list-style-type: none"> ○ Control Area acronym of counter-party (can be empty to submit actuals for Control Area nets). Only one counter party CA per file.
<HourlyProfile>	<ul style="list-style-type: none"> ○ Complex type 	<ul style="list-style-type: none"> ○ Begins hourly profile section.
<Block>	<ul style="list-style-type: none"> ○ Complex type 	<ul style="list-style-type: none"> ○ Data for particular hour. This element may appear multiple times.
<StartTime>	<ul style="list-style-type: none"> ○ DateTime 	<ul style="list-style-type: none"> ○ Start time of hour, in canonical XML format in GMT (future change required to make this available in all time zones).
<MWhImport>	<ul style="list-style-type: none"> ○ Non-negative integer 	<ul style="list-style-type: none"> ○ Net import MWh.
<MWhExport>	<ul style="list-style-type: none"> ○ Non-negative integer 	<ul style="list-style-type: none"> ○ Net export MWh.

2.2.3 Response Format

The success response is:

<SubmitResponse>

<Success></Success>

</SubmitResponse>

~~2.3 Schedule Approval Actions~~

~~2.3.1 Purpose~~

~~This message format is used to submit schedule approval actions. This interface is available to all parties with approval rights on the schedule.~~

~~Note: MP approval actions are taken as the PSE entity type.~~

~~2.3.2 Submittal Format~~

~~The submit request message format is as follows:~~

~~<SubmitRequest>~~

~~<ScheduleApprovalAction>~~


```

<EntityName>XYZ</EntityName>

<EntityType>CA</EntityType>

<ScheduleName>GCA_PSE0000001_LCA</ScheduleName>

<Action>APPROVED</Action>

<Reason>Testing</Reason>

</ScheduleApprovalAction>

</SubmitRequest>
  
```

The following table describes each of the elements and attributes:

Element or Attribute	Data Type	Description
<ScheduleApproval>	Complex type	Root element of approval data. Can only appear once per message.
<EntityName>	Character	CA, TP or PSE acronym.
<EntityType>	Character	Optional value describing the type of the entity taking the action — may be “ALL” or one of the following values (without the quotes) to indicate that the action only applies to specific entity type(s): “CA”, “TP”, “PSE”, “CA-TP”, “CA-PSE”, “TP-PSE”, “CA-TP-PSE”.
<ScheduleName>	Character	Schedule name.
<Action>	Character	Action type — either “APPROVED” or “DENIED” (without the quotes).
<Reason>	Character	A reason associated with the action. It may be empty for “APPROVED” actions but is required for “DENIED” actions.

2.3.3 Response Format

The success response is:

```

<SubmitResponse>

  <Success></Success>
  
```

`</SubmitResponse>`

2.4.2.3 Schedule Download

2.4.12.3.1 Purpose

This message format is used to request schedule data.

2.4.22.3.2 Submittal Format

The submit request message format is as follows:

`<QueryRequest>`

`<QuerySchedules>`

`<Requestor>XYZ</Requestor>`

`<OtherCA></OtherCA>`

`<StartTime>2003-10-16T05:00:00</StartTime>`

`<EndTime>2003-10-17T05:00:00</EndTime>`

`<ScheduleStatus>Active</ScheduleStatus>`

`<NewDataFlag>Y</NewDataFlag>`

`<ProfileFormat>Hourly</ProfileFormat>`

`</QuerySchedules>`

`</QueryRequest>`

The following table describes each of the elements and attributes:

Element or Attribute	Data Type	Description
<code><QuerySchedules></code>	<ul style="list-style-type: none">Complex type	<ul style="list-style-type: none">Root element of query data. Can only appear once per message.
<code><Requestor></code>	<ul style="list-style-type: none">Character	<ul style="list-style-type: none">CA or TP acronym.

<OtherCA>	○ Character	○ Optional counter-party. If specified only schedules between the requestor and OtherCA will be returned.
<StartTime>	○ DateTime	○ Start time of requested time range, in canonical XML format in GMT (future change required to make this available in all time zones).
<EndTime>	○ DateTime	○ End time of requested time range, in canonical XML format in GMT (future change required to make this available in all time zones).
<ScheduleStatus>	○ Character	○ Optional status value. If specified only schedules with the indicated status will be returned. Possible values are: “Proposed”, “Active”, “Inactive”.
<NewDataFlag>	○ Character	○ Y: only include schedules for which there is new data. N: Include all schedules matching the request.
<ProfileFormat>	○ Character	○ The desired format for the returned schedule profile data; either “Hourly” or “InflectionPoint”.

2.4.32.3.3 Response Format

The success response is:

<QueryResponse>

<Schedules>

<Schedule>

...

</Schedule>

<Schedule>

...

</Schedule>

</Schedules>

</QueryResponse>

The format of the XML for each schedule is as follows:

<Schedule>

 <ScheduleHeader>

 <ScheduleName>GCA_PSE0000001_LCA</ScheduleName>

 </ScheduleHeader>

 <ScheduleTable>

 <ReferenceEntity>XYZ</ReferenceEntity>

 <SourceCA>ABC</SourceCA>

 <SinkCA>XYZ</SinkCA>

 <SourceGenerator></SourceGenerator>

 <LoadEntity></LoadEntity>

 <PSE></PSE>

 <ScheduleType>Energy</ScheduleType>

 <TimeZone>ES</TimeZone>

 <ProfileFormat>Hourly</ProfileFormat>

 <TagName>GCA_PSE0000001_LCA</TagName>

 <Path>POR/POD</Path>

 <Contract></Contract>

 <ScheduleStatus>Active</ScheduleStatus>

 </ScheduleTable>

```

<ScheduleProfileTable>

  <Block>

    <StartTime>2003-10-07T12:00:00</StartTime>

    <FlowMW>100</FlowMW>

    <EstimatedMW>100</EstimatedMW>

  </Block>

</ScheduleProfileTable>

<OASISTable>

  <Reservation>

    <Provider>Midwest ISO</Provider>

    <OASISNumber>123</OASISNumber>

    <NERCPriority>2</NERCPriority>

  </Reservation>

</OASISTable>

</Schedule>
  
```

Note that the order of the elements may not match what is listed here.

The following table describes the elements and attributes:

Element or Attribute	Data Type	Description
<Schedule>	o Complex type	o Root element of schedule data. Will appear once for each schedule being returned.
<ScheduleHeader>	o Complex type	o Contains information used to identify the schedule.
<ScheduleName>	o Character	o Schedule name.
<ScheduleTable>	o Complex type	o Contains various properties of the schedule; will appear

Element or Attribute	Data Type	Description
		exactly once per schedule.
<ReferenceEntity>	o Character	o Acronym of the Control Area that the schedule is for.
<SourceCA>	o Character	o Source Control Area.
<SinkCA>	o Character	o Sink Control Area.
<SourceGenerator>	o Character	o Source generator for schedule (may be empty).
<LoadEntity>	o Character	o Load entity for schedule (may be empty).
<PSE>	o Character	o Creating PSE (may be empty).
<ScheduleType>	o Character	o One of the supported schedule types: Energy, Dynamic, etc.
<TimeZone>	o Character	o Two-character time zone designation, for example, "UT", "CS", or "ES". This time zone should be used to interpret the times in the profile.
<ProfileFormat>	o Character	o Either "Hourly" or "InflectionPoint" (will match the format specified in the request).
<TagName>	o Character	o Tag name (will be empty if the schedule was not created from a tag).
<Path>	o Character	o Transmission path (for tagged schedules this will be a POR/POD value obtained from the tag's physical path).
<Contract>	o Character	o Contract value (may be empty).
<ScheduleStatus>	o Character	o One of: "Proposed", "Active", "Inactive".
<ScheduleProfileTable>	o Complex type	o Begins the profile section.
<Block>	o Complex type	o Represents a single block of time in the profile.
<StartTime>	o DateTime	o Start time of profile block, relative to the time zone specified in the header.
<FlowMW>	o Integer	o MW value.
<EstimatedMW>	o Integer	o Scheduled MW value, without regard to any status values.
<OasisTable>	o Complex type	o Begins section for oasis reservations associated with

Element or Attribute	Data Type	Description
		the schedule. This element may not be present if there are no reservations associated with the schedule.
<Reservation>	o Complex type	o Represents a single oasis reservation associated with the schedule. Multiple occurrences may be present.
<Provider>	o Character	o Provider of the reservation.
<OasisNumber>	o Character	o Assignment reference number.
<NERCPriority>	o Non-negative integer	o Curtailment priority.

2.5.2.4 Market Participant Schedule Download

2.5.12.4.1 Purpose

This message format is used to request a copy of a market participant’s schedule data. This interface is only available to market participants. Access rights to schedules are determined based on the MP (Market Participant) associated with the schedule. The MP in PSS is defined as the first PSE entity in the tag that owns a Midwest ISO transmission reservation on the tag. Note that market participants are not permitted to request this data more frequently than once per hour.

2.5.22.4.2 Submittal Format

The submit request message format is as follows:

<QueryRequest>

<QueryMarketClearing>

<Requestor>XYZ</Requestor>

<StartTime>2003-10-16T05:00:00</StartTime>

<EndTime>2003-10-17T05:00:00</EndTime>

<TimeZone>ES</TimeZone>

</QueryMarketClearing>

</QueryRequest>

The following table describes each of the elements and attributes:

Element or Attribute	Data Type	Description
<QueryMarketClearing>	<ul style="list-style-type: none"> ○ Complex type 	<ul style="list-style-type: none"> ○ Root element of query data. Can only appear once per message.
<ul style="list-style-type: none"> ○ <Requestor> 	<ul style="list-style-type: none"> ○ Character 	<ul style="list-style-type: none"> ○ PSE acronym.
<ul style="list-style-type: none"> ○ <StartTime> 	<ul style="list-style-type: none"> ○ DateTime 	<ul style="list-style-type: none"> ○ Start time of requested time range, in canonical XML format. The Start time should not be greater than the day-ahead market clearing date. For operational data (less than 2 days in the past), StartTime must not be more than 3 days before EndTime. For historical data, StartTime must not be more than 1 day before EndTime.
<ul style="list-style-type: none"> ○ <EndTime> 	<ul style="list-style-type: none"> ○ DateTime 	<ul style="list-style-type: none"> ○ End time of requested time range, in canonical XML format.
<ul style="list-style-type: none"> ○ <TimeZone> 	<ul style="list-style-type: none"> ○ Character 	<ul style="list-style-type: none"> ○ Two-character time zone code describing which time zone the Start/End times are in, and which time zone the data will be returned in. Accepted values are: UT,PS,MS,CS,ES,AS,PD,MD,CD,E D,AD

2.5.32.4.3 Response Format

The success response is:

<QueryResponse>

<MarketClearing>

<Schedule>

...

</Schedule>

<Schedule>

...

</Schedule>

</ MarketClearing>

</QueryResponse>

The format of the XML for each schedule is as follows:

<Schedule>

 <ScheduleHeader>

 <ScheduleName>GCA_PSE0000001_LCA</ScheduleName>

 </ScheduleHeader>

 <ScheduleTable>

 <ReferenceEntity>XYZ</ReferenceEntity>

 <SourceCA>ABC</SourceCA>

 <SinkCA>XYZ</SinkCA>

 <SourceGenerator></SourceGenerator>

 <LoadEntity></LoadEntity>

 <PSE></PSE>

 <ScheduleType>Energy</ScheduleType>

 <MarketType>DA/RT</ MarketType >

 <TimeZone>ES</TimeZone>

 <ProfileFormat>Hourly</ProfileFormat>

```
<TagName>GCA_PSE0000001_LCA</TagName>

<Path>POR/POD</Path>

<Contract></Contract>

<ScheduleStatus>Active</ScheduleStatus>

</ScheduleTable>

<ScheduleProfileTable>

  <Block>

    <StartTime>2003-10-07T12:00:00</StartTime>

    <BidMW>100</ BidMW>

    <ClearedMW>100</ ClearedMW>

    <RealTimeMW>100</RealTimeMW>

  </Block>

</ScheduleProfileTable>

<OASISTable>

  <Reservation>

    <Provider>Midwest ISO</Provider>

    <OASISNumber>123</OASISNumber>

    <NERCPriority>2</NERCPriority>

  </Reservation>

</OASISTable>

</Schedule>
```

Note that the order of the elements may not match what is listed here.

The following table describes the elements and attributes:

Element or Attribute	Data Type	Description
<Schedule>	o Complex type	o Root element of schedule data. Will appear once for each schedule being returned.
<ScheduleHeader>	o Complex type	o Contains information used to identify the schedule.
<ScheduleName>	o Character	o Schedule name.
<ScheduleTable>	o Complex type	o Contains various properties of the schedule; will appear exactly once per schedule.
<ReferenceEntity>	o Character	o Acronym of the Control Area that the schedule is for.
<SourceCA>	o Character	o Source Control Area.
<SinkCA>	o Character	o Sink Control Area.
<SourceGenerator>	o Character	o Source generator for schedule (may be empty).
<LoadEntity>	o Character	o Load entity for schedule (may be empty).
<PSE>	o Character	o Creating PSE (may be empty).
<ScheduleType>	o Character	o One of the supported schedule types: Energy, Dynamic, etc.
<MarketType>	o Character	o One of the supported market types: DA, RT, DA/RT.
<TimeZone>	o Character	o Two-character time zone designation, for example, "UT", "CS", or "ES". This time zone should be used to interpret the times in the profile.
<ProfileFormat>	o Character	o "Hourly".
<TagName>	o Character	o Tag name (will be empty if the schedule was not created from a tag).
<Path>	o Character	o Transmission path (for tagged schedules this will be a POR/POD value obtained from the tag's physical path).
<Contract>	o Character	o Contract value (may be

Element or Attribute	Data Type	Description
		empty).
<ScheduleStatus>	o Character	o One of: "Proposed", "Active", "Inactive".
<ScheduleProfileTable>	o Complex type	o Begins the profile section.
<Block>	o Complex type	o Represents a single block of time in the profile.
<StartTime>	o DateTime	o Start time of profile block, relative to the time zone specified in the header.
<BidMW>	o Integer	o MW value bid into the market.
<ClearedMW>	o Integer	o MW value cleared from the market.
<RealTimeMW>	o Integer	o MW value that is scheduled to flow in PSS before the start of that hour, and the amount that is recorded as flowing in PSS after the end of that hour.
<OasisTable>	o Complex type	o Begins section for oasis reservations associated with the schedule. This element may not be present if there are no reservations associated with the schedule.
<Reservation>	o Complex type	o Represents a single oasis reservation associated with the schedule. Multiple occurrences may be present.
<Provider>	o Character	o Provider of the reservation.
<OasisNumber>	o Character	o Assignment reference number.
<NERCPriority>	o Non-negative integer	o Curtailment priority.

3. Fault Responses for the PSS XML/SOAP Interfaces

The following list of possible errors does not include errors related to message format problems (i.e., schema-related errors) or protocol errors (such as invalid content type).

Items in brackets (e.g., "<ScheduleName>") represent placeholders; the actual content will vary. In some cases the names of these placeholders match the name of the XML element.

For the "SubmitRequest" interfaces, there are generally two categories of faultstrings:

1) "<ScheduleName>. SMP communication failure (code=<code>): <description>"

Note: this message results from an internal client/server communication failure (for example, if a server was having problems, or if there was a timeout). There is a one-to-one correspondence between the numeric codes and error descriptions. For timeouts, the error description will be "No reply"; in this case it is possible that the request actually succeeded, but a re-try may be needed.

2) "<ScheduleName>. fail reason: <fail reason>"

For the Actuals Upload Interface the schedule name will be empty. The fail reasons are described separately for each interface in the sections below. Note that the fail reason may contain line number references; those lines numbers are not related to the XML message content of the request and should be ignored.

The fault responses also include a fault code. A single fault code may be used for multiple errors. The fault codes are as follows:

Permission errors for the Schedule Upload and Actuals Upload Interfaces return -100 for the fault code. For example:

```
<faultcode>SOAP-ENV:-100</faultcode>
```

```
<faultstring>Schedule-upload permission denied for requestor TEST</faultstring>
```

Protocol errors, such as invalid content type, return fault codes in the range of -20 to +20. Schema validation errors generate faults with fault codes in the range of 20001 to 20009. All of the fault responses for the other errors as indicated in the following sections return a fault code of -101.

Security (certificate) and validation errors will return a fault code -102. For example:

```
<faultcode>SOAP-ENV:-102</faultcode>
```

```
<faultstring>Client credentials are not valid for the entity indicated in the submitted data</faultstring>
```

~~3.1~~ **Schedule Approval Interface**

Fault strings:

- ~~<fail reason> (as described above):~~
 - ~~"Unable to successfully process message due to a program exception"~~
 - ~~"Unable to update schedule because it is locked"~~
 - ~~"Schedule is not available"~~
 - ~~"Schedule is not available or you do not have permission to access it"~~
 - ~~"The specified entity does not have approval rights for the schedule"~~
 - ~~"You are not allowed to take an approval action on this REVISED schedule"~~
 - ~~"Approval actions are not allowed on schedule in <State> state"~~
~~where <State> is one of the following: APPROVED, REJECTED, SUSPENDED~~
 - ~~"You must specify a Reason"~~
~~(Note: reasons are required when the action is "DENIED")~~

~~3.23.1~~ **Schedule Upload Interface**

Fault strings:

- "Schedule-upload permission denied for requestor <Requestor>"
- <fail reason> (as described above):
 - "Unable to successfully process message due to a program exception"
 - "Unable to enter schedule due to program exception"
 - "Unable to enter or modify schedule due to program exception"
 - "Unable to enter schedule because it is locked"

- “Start time must not be earlier than previous stop time”

Note: this is related to the ordering of blocks in the profile-

- “Stop time must be later than start time”

- “The PROFILE table is invalid: inconsistent use of import and export MW values”

Note: this results from an improper mix of MWImport and MWExport values between different profile blocks-

- “Source Control Area '<SourceCA>' doesn't match the original schedule”

- “Sink Control Area '<SinkCA>' doesn't match the original schedule”

- “PSE '<PSE>' doesn't match the original schedule”

- “Either the source, sink, and/or PSE do not match the original schedule”

Note: these errors only occur if the schedule already exists and the data in the upload request doesn't match the existing schedule; if uploading a new schedule the PSE value can be empty-

- “The target entity ('<Requestor>') must be the same as the sink ('<SinkCA>')”

- “The target entity ('<Requestor>') must be the same as the source ('<SourceCA>')”

- “The source or sink cannot be one of the requestor's CAs when the schedule flow type is wheel”

- “The sink cannot be the one of the requestor's CAs when the schedule flow type is export”

- “The source cannot be one of the requestor's CAs when the schedule flow type is import”

- “The source and sink must be different for an import or export schedule”

Note: these errors result from an inconsistency between the source and/or sink Control Areas and whether import or export values are specified in the profile-

- “Unable to enter or modify schedule - schedule profile unavailable for time '<date/time>' CST”

Note: schedules cannot be extended through the XML interface; only the time range of the existing profile can be updated. If a schedule needs to be extended then an additional daily schedule should be created through the PSS web interface (or by extending the tag profile)

- “After-the-fact schedules may be submitted for past hours only”
- “After-the-fact schedule must be submitted within <number-of-days> days from its start date (deadline: <date/time>)”

Note: the number of days is dependent on a system configuration parameter

3.33.2 Actuals Upload Interface

Fault strings:

- “Schedule-upload permission denied for requestor <Requestor>”
- “CA <CA2> is not a configured tie for <CA1>.”
- <fail reason> (as described above):
 - “Unable to successfully process message due to a program exception”
 - “Unable to enter schedule due to program exception”
 - “Some data could not be updated because it was locked”
 - “Start time must not be earlier than previous stop time”

Note: this is related to the ordering of blocks in the profile.

- “Actuals must be submitted within <number-of-days> days (approximate deadline: <date/time>)”

Note. The number of days is dependent on a system configuration parameter (same one as for schedule upload).

- “Profile time too far in the past, for block starting <date/time> CST”

Note: This message does not necessarily mean that no data was updated; it also only occurs if the specified time is two or more days (approximately) in the past (if possible Actuals data should be submitted within two days).

3.43.3 Schedule Download Interface

Fault strings:

- “Schedules for <Requestor> are unavailable”

Note: this is a permissions check based on system configuration; it is not related to system loading or other such factors.

- “Invalid request: end time must be later than start time”
- “Invalid request: time range is too long (limit=<hours> hours)”

Note: the limit on the time range is dependent on certain request parameters, such as whether the time range would include historical data.

3.53.4 Market Participant Schedule Download Interface

Fault strings:

- “Requestor does not match presented certificate”
- “You may not query for clearing data more frequently than once per hour. Please wait at least <minutes> minutes before submitting your next query”
- “Invalid start time in request: <start time>”
- “Invalid end time in request: <end time>”
- “Invalid request: end time must be later than start time”

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